

WHAT IS CLAIMED IS:

1. An image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device, wherein:

the imaging device includes a plurality of light receiving sections arranged in rows and columns;

the plurality of light receiving sections each include a color filter; and

the image processing apparatus comprises:

a horizontal direction interpolation section for performing data interpolation in a horizontal direction using a plurality of pieces of pixel data adjacent to a first pixel position in the horizontal direction to generate a first color signal;

a line memory section for storing the first color signal in units of a plurality of lines;

a vertical direction interpolation section for performing data interpolation in a vertical direction using a plurality of pieces of pixel data, among pieces of data output from the line memory section, adjacent to a second pixel position in the vertical direction to generate a second color signal; and

a luminance and color difference signal generation

section for generating a luminance signal and color difference signals based on the second color signal.

2. An image processing section according to claim 1, wherein the horizontal direction interpolation section includes:

- a horizontal direction interpolation circuit for, when the color filters are provided in a Bayer arrangement, outputting an R data signal based on an RG line, outputting a B data signal based on a GB line, and outputting a G data signal based on the RG line and the GB line; and

- a differential signal output section for outputting a first differential signal based on the R data signal and the G data signal and outputting a second differential signal based on the B data signal and the G data signal.

3. An image processing apparatus according to claim 2, wherein the horizontal direction interpolation section includes:

- a four-stage shift register section for sequentially holding a plurality of pieces of pixel data;

- a first addition section for adding pieces of data output from odd-numbered stages of the shift register;

a second addition section for adding pieces of data output from even-numbered stages of the shift register;

a first selection section for selecting one of the data output from the first addition section and the data output from the second addition section so as to output one of an R data signal and a B data signal; and

a second selection section for selecting one of the data output from the first addition section and the data output from the second addition section so as to output a G data signal.

4. An image processing apparatus according to claim 1, wherein the line memory section thins out the first color signal in the horizontal direction and stores the thinned-out first color signal therein.

5. An image processing apparatus according to claim 2, wherein the line memory section includes:

a first line memory for receiving the first differential signal and the second differential signal;

a second line memory for receiving the data signal output from the first line memory;

a third line memory for receiving the data signal output from the second line memory;

a fourth line memory for receiving the G data signal;

a fifth line memory for receiving the data signal output from the fourth line memory; and

a sixth line memory for receiving the data signal output from the fifth line memory.

6. An image processing apparatus according to claim 5, wherein the vertical direction interpolation section receives the first differential signal, the second differential signal, the G data signal, and the data signal from each of the first through sixth line memories.

7. An image processing apparatus according to claim 4, further comprising an intermittent clock signal generation section for generating an intermittent clock signal having a frequency lower than a frequency of a clock signal which is input to the horizontal direction interpolation section; wherein the line memory section, the vertical direction interpolation section, and the luminance and color difference signal generation section operate based on the intermittent clock signal.

8. An image processing apparatus according to claim 1,

wherein:

the horizontal direction interpolation section generates the first color signal using a filter for weighting at least one of the plurality of pieces of pixel data adjacent to the first pixel position in the horizontal direction, and

the vertical direction interpolation section generates the second color signal using a filter for weighting at least one of the plurality of pieces of pixel data adjacent to the second pixel position in the vertical direction.

9. A digital still camera, comprising:

an imaging device; and

an image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is input from the imaging device, wherein:

the imaging device includes a plurality of light receiving sections arranged in rows and columns;

the plurality of light receiving sections each include a color filter; and

the image processing apparatus comprises:

a horizontal direction interpolation section for performing data interpolation in a horizontal direction

using a plurality of pieces of pixel data adjacent to a first pixel position in the horizontal direction to generate a first color signal;

a line memory section for storing the first color signal in units of a plurality of lines;

a vertical direction interpolation section for performing data interpolation in a vertical direction using a plurality of pieces of pixel data, among pieces of data output from the line memory section, adjacent to a second pixel position in the vertical direction to generate a second color signal; and

a luminance and color difference signal generation section for generating a luminance signal and color difference signals based on the second color signal.

10. An image processing method for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device, wherein:

the imaging device includes a plurality of light receiving sections arranged in rows and columns;

the plurality of light receiving sections each include a color filter; and

the image processing method comprises:

a first step of performing data interpolation in

a horizontal direction using a plurality of pieces of pixel data adjacent to a first pixel position in the horizontal direction to generate a first color signal;

a second step of storing the first color signal in units of a plurality of lines;

a third step of performing data interpolation in a vertical direction using a plurality of pieces of pixel data, among pieces of data represented by the first color signal, adjacent to a second pixel position in the vertical direction to generate a second color signal; and

a fourth step of generating a luminance signal and color difference signals based on the second color signal.

11. An image processing method according to claim 10, further comprising the step of generating an intermittent clock signal having a frequency lower than a frequency of a clock signal used at the first step, wherein the second through fourth steps are executed based on the intermittent clock signal.